



SEQUENCE LISTING

<110> Apicella, Michael A.
Edwards, Jennifer L.

<120> Vaccine and compositions for the prevention and treatment of
Neisserial infections

<130> 17023-031001

<140> US 10/665,990
<141> 2003-09-19

<150> US 10/621,184
<151> 2003-07-15

<150> US 10/066,551
<151> 2002-01-31

<150> US 60/344,452
<151> 2001-10-23

<150> US 60/310,356
<151> 2001-08-06

<150> US 60/266,070
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<170> FastSEQ for Windows Version 4.0

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<211> 2015
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Ala Gly Ser Ser Val Ser Val Ser Leu Lys Thr Ser Gly Asp Leu Cys
35 40 45
Gly Lys Leu Lys Thr Thr Leu Lys Thr Leu Val Cys Ser Leu Val Ser
50 55 60
Leu Ser Met Val Leu Pro Ala His Ala Gln Ile Thr Thr Asp Lys Ser
65 70 75 80
Ala Pro Lys Asn Gln Val Val Ile Leu Lys Thr Asn Thr Gly Ala
85 90 95
Pro Leu Val Asn Ile Gln Thr Pro Asn Gly Arg Gly Leu Ser His Asn
100 105 110
Arg Tyr Thr Gln Phe Asp Val Asp Asn Lys Gly Ala Val Leu Asn Asn
115 120 125
Asp Arg Asn Asn Asn Pro Phe Leu Val Lys Gly Ser Ala Gln Leu Ile
130 135 140

Leu	Asn	Glu	Val	Arg	Gly	Thr	Ala	Ser	Lys	Leu	Asn	Gly	Ile	Val	Thr	
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Thr	Val	Asn	Gly	Gly	Gly	Phe	Lys	Asn	Val	Gly	Arg	Gly	Ile	Leu	Thr	
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Ile	Gly	Ala	Pro	Gln	Ile	Gly	Lys	Asp	Gly	Ala	Leu	Thr	Gly	Phe	Asp	
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Val	Arg	Gln	Gly	Thr	Leu	Thr	Val	Gly	Ala	Ala	Gly	Trp	Asn	Asp	Lys	
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Gly	Gly	Ala	Asp	Tyr	Thr	Gly	Val	Leu	Ala	Arg	Ala	Val	Ala	Leu	Gln	
225					230					235					240	
Gly	Lys	Leu	Gln	Gly	Lys	Asn	Leu	Ala	Val	Ser	Thr	Gly	Pro	Gln	Lys	
			245						250					255		
Val	Asp	Tyr	Ala	Ser	Gly	Glu	Ile	Ser	Ala	Gly	Thr	Ala	Ala	Gly	Thr	
			260					265						270		
Lys	Pro	Thr	Ile	Ala	Leu	Asp	Thr	Ala	Ala	Leu	Gly	Gly	Met	Tyr	Ala	
		275					280					285				
Asp	Ser	Ile	Thr	Leu	Ile	Ala	Asn	Glu	Lys	Gly	Val	Gly	Val	Lys	Asn	
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Ala	Gly	Thr	Leu	Glu	Ala	Ala	Lys	Gln	Leu	Ile	Val	Thr	Ser	Ser	Gly	
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Arg	Ile	Glu	Asn	Ser	Gly	Arg	Ile	Ala	Thr	Thr	Ala	Asp	Gly	Thr	Glu	
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Ala	Ser	Pro	Thr	Tyr	Leu	Ser	Ile	Glu	Thr	Thr	Glu	Lys	Gly	Ala	Ala	
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Gly	Thr	Phe	Ile	Ser	Asn	Gly	Gly	Arg	Ile	Glu	Ser	Lys	Gly	Leu	Leu	
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Val	Ile	Glu	Thr	Gly	Glu	Asp	Ile	Ser	Leu	Arg	Asn	Gly	Ala	Val	Val	
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Gln	Asn	Asn	Gly	Ser	Arg	Pro	Ala	Thr	Thr	Val	Leu	Asn	Ala	Gly	His	
385					390					395					400	
Asn	Leu	Val	Ile	Glu	Ser	Lys	Thr	Asn	Val	Asn	Asn	Ala	Lys	Gly	Ser	
			405						410					415		
Ala	Asn	Leu	Ser	Ala	Gly	Gly	Arg	Thr	Thr	Ile	Asn	Asp	Ala	Thr	Ile	
		420					425						430			
Gln	Ala	Gly	Ser	Ser	Val	Tyr	Ser	Ser	Thr	Lys	Gly	Asp	Thr	Glu	Leu	
	435						440					445				
Gly	Glu	Asn	Thr	Arg	Ile	Ile	Ala	Glu	Asn	Val	Thr	Val	Leu	Ser	Asn	
	450					455				460						
Gly	Ser	Ile	Gly	Ser	Ala	Ala	Val	Ile	Glu	Ala	Lys	Asp	Thr	Ala	His	
465					470					475					480	
Ile	Glu	Ser	Gly	Lys	Pro	Leu	Ser	Leu	Glu	Thr	Ser	Thr	Val	Ala	Ser	
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Asn	Ile	Arg	Leu	Asn	Asn	Gly	Asn	Ile	Lys	Gly	Gly	Lys	Gln	Leu	Ala	
		500						505					510			
Leu	Leu	Ala	Asp	Asp	Asn	Ile	Thr	Ala	Lys	Thr	Thr	Asn	Leu	Asn	Thr	
	515						520					525				
Pro	Gly	Asn	Leu	Tyr	Val	His	Thr	Gly	Lys	Asp	Leu	Asn	Leu	Asn	Val	
	530					535					540					
Asp	Lys	Asp	Leu	Ser	Ala	Ala	Ser	Ile	His	Leu	Lys	Ser	Asp	Asn	Ala	
545					550					555					560	
Ala	His	Ile	Thr	Gly	Thr	Ser	Lys	Thr	Leu	Thr	Ala	Ser	Lys	Asp	Met	
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Gly	Val	Glu	Ala	Gly	Leu	Leu	Asn	Val	Thr	Asn	Thr	Asn	Leu	Arg	Thr	
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Asn	Ser	Gly	Asn	Leu	His	Ile	Gln	Ala	Ala	Lys	Gly	Asn	Ile	Gln	Leu	

595	600	605
Arg Asn Thr Lys Leu Asn Ala Ala Lys Ala Leu Glu Thr Thr Ala Leu		
610	615	620
Gln Gly Asn Ile Val Ser Asp Gly Leu His Ala Val Ser Ala Asp Gly		
625	630	635
His Val Ser Leu Leu Ala Asn Gly Asn Ala Asp Phe Thr Gly His Asn		
	645	650
Thr Leu Thr Ala Lys Ala Asp Val Asn Ala Gly Ser Val Gly Lys Gly		
	660	665
Arg Leu Lys Ala Asp Asn Thr Asn Ile Thr Ser Ser Ser Gly Asp Ile		
	675	680
Thr Leu Val Ala Gly Asn Gly Ile Gln Leu Gly Asp Gly Lys Gln Arg		
	690	695
Asn Ser Ile Asn Gly Lys His Ile Ser Ile Lys Asn Asn Gly Gly Asn		
705	710	715
Ala Asp Leu Lys Asn Leu Asn Val His Ala Lys Ser Gly Ala Leu Asn		
	725	730
Ile His Ser Asp Arg Ala Leu Ser Ile Glu Asn Thr Lys Leu Glu Ser		
	740	745
Thr His Asn Thr His Leu Asn Ala Gln His Glu Arg Val Thr Leu Asn		
	755	760
Gln Val Asp Ala Tyr Ala His Arg His Leu Ser Ile Thr Gly Ser Gln		
	770	775
Ile Trp Gln Asn Asp Lys Leu Pro Ser Ala Asn Lys Leu Val Ala Asn		
785	790	795
Gly Val Leu Ala Leu Asn Ala Arg Tyr Ser Gln Ile Ala Asp Asn Thr		
	805	810
Thr Leu Arg Ala Gly Ala Ile Asn Leu Thr Ala Gly Thr Ala Leu Val		
	820	825
Lys Arg Gly Asn Ile Asn Trp Ser Thr Val Ser Thr Lys Thr Leu Glu		
	835	840
Asp Asn Ala Glu Leu Lys Pro Leu Ala Gly Arg Leu Asn Ile Glu Ala		
	850	855
Gly Ser Gly Thr Leu Thr Ile Glu Pro Ala Asn Arg Ile Ser Ala His		
865	870	875
Thr Asp Leu Ser Ile Lys Thr Gly Gly Lys Leu Leu Leu Ser Ala Lys		
	885	890
Gly Gly Asn Ala Gly Ala Pro Ser Ala Gln Val Ser Ser Leu Glu Ala		
	900	905
Lys Gly Asn Ile Arg Leu Val Thr Gly Glu Thr Asp Leu Arg Gly Ser		
	915	920
Lys Ile Thr Ala Gly Lys Asn Leu Val Val Ala Thr Thr Lys Gly Lys		
	930	935
Leu Asn Ile Glu Ala Val Asn Asn Ser Phe Ser Asn Tyr Phe Pro Thr		
945	950	955
Gln Lys Ala Ala Glu Leu Asn Gln Lys Ser Lys Glu Leu Glu Gln Gln		
	965	970
Ile Ala Gln Leu Lys Lys Ser Ser Pro Lys Ser Lys Leu Ile Pro Thr		
	980	985
Leu Gln Glu Arg Asp Arg Leu Ala Phe Tyr Ile Gln Ala Ile Asn		
	995	1000
Lys Glu Val Lys Gly Lys Lys Pro Lys Gly Lys Glu Tyr Leu Gln Ala		
	1010	1015
Lys Leu Ser Ala Gln Asn Ile Asp Leu Ile Ser Ala Gln Gly Ile Glu		
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Ile Ser Gly Ser Asp Ile Thr Ala Ser Lys Lys Leu Asn Leu His Ala		
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		1055

Ala Gly Val Leu Pro Lys Ala Ala Asp Ser Glu Ala Ala Ala Ile Leu
 1060 1065 1070
 Ile Asp Gly Ile Thr Asp Gln Tyr Glu Ile Gly Lys Pro Thr Tyr Lys
 1075 1080 1085
 Ser His Tyr Asp Lys Ala Ala Leu Asn Lys Pro Ser Arg Leu Thr Gly
 1090 1095 1100
 Arg Thr Gly Val Ser Ile His Ala Ala Ala Leu Asp Asp Ala Arg
 1105 1110 1115 1120
 Ile Ile Ile Gly Ala Ser Glu Ile Lys Ala Pro Ser Gly Ser Ile Asp
 1125 1130 1135
 Ile Lys Ala His Ser Asp Ile Val Leu Glu Ala Gly Gln Asn Asp Ala
 1140 1145 1150
 Tyr Thr Phe Leu Lys Thr Lys Gly Lys Ser Gly Lys Ile Ile Arg Lys
 1155 1160 1165
 Thr Lys Phe Thr Ser Thr Arg Asp His Leu Ile Met Pro Ala Pro Val
 1170 1175 1180
 Glu Leu Thr Ala Asn Gly Ile Thr Leu Gln Ala Gly Gly Asn Ile Glu
 1185 1190 1195 1200
 Ala Asn Thr Thr Arg Phe Asn Ala Pro Ala Gly Lys Val Thr Leu Val
 1205 1210 1215
 Ala Gly Glu Glu Leu Gln Leu Leu Ala Glu Glu Gly Ile His Lys His
 1220 1225 1230
 Glu Leu Asp Val Gln Lys Ser Arg Arg Phe Ile Gly Ile Lys Val Gly
 1235 1240 1245
 Lys Ser Asn Tyr Ser Lys Asn Glu Leu Asn Glu Thr Lys Leu Pro Val
 1250 1255 1260
 Arg Val Val Ala Gln Thr Ala Ala Thr Arg Ser Gly Trp Asp Thr Val
 1265 1270 1275 1280
 Leu Glu Gly Thr Glu Phe Lys Thr Thr Leu Ala Gly Ala Asp Ile Gln
 1285 1290 1295
 Ala Gly Val Gly Glu Lys Ala Arg Val Asp Ala Lys Ile Ile Leu Lys
 1300 1305 1310
 Gly Ile Val Asn Arg Ile Gln Ser Glu Glu Lys Leu Glu Thr Asn Ser
 1315 1320 1325
 Thr Val Trp Gln Lys Gln Ala Gly Arg Gly Ser Thr Ile Glu Thr Leu
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 Lys Leu Pro Ser Phe Glu Ser Pro Thr Pro Pro Lys Leu Ser Ala Pro
 1345 1350 1355 1360
 Gly Gly Tyr Ile Val Asp Ile Pro Lys Gly Asn Leu Lys Thr Glu Ile
 1365 1370 1375
 Glu Lys Leu Ser Lys Gln Pro Glu Tyr Ala Tyr Leu Lys Gln Leu Gln
 1380 1385 1390
 Val Ala Lys Asn Ile Asn Trp Asn Gln Val Gln Leu Ala Tyr Asp Arg
 1395 1400 1405
 Trp Asp Tyr Lys Gln Glu Gly Leu Thr Glu Ala Gly Ala Ala Ile Ile
 1410 1415 1420
 Ala Leu Ala Val Thr Val Val Thr Ser Gly Ala Gly Thr Gly Ala Val
 1425 1430 1435 1440
 Leu Gly Leu Asn Gly Ala Ala Ala Ala Thr Asp Ala Ala Phe Ala
 1445 1450 1455
 Ser Leu Ala Ser Gln Ala Ser Val Ser Phe Ile Asn Asn Lys Gly Asp
 1460 1465 1470
 Val Gly Lys Thr Leu Lys Glu Leu Gly Arg Ser Ser Thr Val Lys Asn
 1475 1480 1485
 Leu Val Val Ala Ala Ala Thr Ala Gly Val Ala Asp Lys Ile Gly Ala
 1490 1495 1500
 Ser Ala Leu Asn Asn Val Ser Asp Lys Gln Trp Ile Asn Asn Leu Thr

Gln	Gln	Leu	Gly	Asn	Asn	Arg	Asn	Val	Ser	Gly	Arg	Ile	Asp	Leu	Phe
1970						1975					1980				
Thr	Glu	Leu	Lys	Ala	Cys	Gln	Ser	Cys	Ser	Asn	Val	Ile	Leu	Glu	Phe
1985					1990					1995					2000
Arg	Asn	Arg	Tyr	Pro	Asn	Ile	Gln	Leu	Asn	Ile	Phe	Thr	Gly	Lys	
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<211> 764

<212> PRT

<213> Neisseria gonorrhoeae

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Thr	Glu	Gln	Ser	Val	Gly	Leu	Glu	Thr	Val	Ser	Val	Val	Gly	Lys	Ser
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Arg	Pro	Arg	Ala	Thr	Ser	Gly	Leu	Leu	His	Thr	Ser	Thr	Ala	Ser	Asp
	50					55					60				
Lys	Ile	Ile	Ser	Gly	Asp	Thr	Leu	Arg	Gln	Lys	Ala	Val	Asn	Leu	Gly
65					70					75					80
Asp	Ala	Leu	Asp	Gly	Val	Pro	Gly	Ile	His	Ala	Ser	Gln	Tyr	Gly	Gly
				85					90					95	
Gly	Ala	Ser	Ala	Pro	Val	Ile	Arg	Gly	Gln	Thr	Gly	Arg	Arg	Ile	Lys
			100					105					110		
Val	Leu	Asn	His	His	Gly	Glu	Thr	Gly	Asp	Met	Ala	Asp	Phe	Ser	Pro
		115					120					125			
Asp	His	Ala	Ile	Met	Val	Asp	Ser	Ala	Leu	Ser	Gln	Gln	Val	Glu	Ile
	130					135					140				
Leu	Arg	Gly	Pro	Val	Thr	Leu	Leu	Tyr	Ser	Ser	Gly	Asn	Val	Ala	Gly
145					150					155					160
Leu	Val	Asp	Val	Ala	Asp	Gly	Lys	Ile	Pro	Glu	Lys	Met	Pro	Glu	Asn
				165					170					175	
Gly	Val	Ser	Gly	Glu	Leu	Gly	Leu	Arg	Leu	Ser	Ser	Gly	Asn	Leu	Glu
			180					185					190		
Lys	Leu	Thr	Ser	Gly	Gly	Ile	Asn	Ile	Gly	Leu	Gly	Lys	Asn	Phe	Val
		195					200					205			
Leu	His	Thr	Glu	Gly	Leu	Tyr	Arg	Lys	Ser	Gly	Asp	Tyr	Ala	Val	Pro
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225					230					235					240
Thr	Gly	Ser	Ile	Gly	Leu	Ser	Trp	Val	Gly	Glu	Lys	Gly	Phe	Ile	Gly
				245					250					255	
Ala	Ala	Tyr	Ser	Asp	Arg	Arg	Asp	Gln	Tyr	Gly	Leu	Pro	Ala	His	Ser
			260					265					270		
His	Glu	Tyr	Asp	Asp	Cys	His	Ala	Asp	Ile	Ile	Trp	Gln	Lys	Ser	Leu
		275					280					285			
Ile	Asn	Lys	Arg	Tyr	Leu	Gln	Leu	Tyr	Pro	His	Leu	Leu	Thr	Glu	Glu
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Asp	Ile	Asp	Tyr	Asp	Asn	Pro	Gly	Leu	Ser	Cys	Gly	Phe	His	Asp	Asp
305					310					315					320
Asp	Asp	Ala	His	Ala	His	Ala	His	Asn	Gly	Lys	Pro	Trp	Ile	Asp	Leu
				325					330					335	
Arg	Asn	Lys	Arg	Tyr	Glu	Leu	Arg	Ala	Glu	Trp	Lys	Gln	Pro	Phe	Pro
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<213> Neisseria gonorrhoeae

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Thr Val Thr Val Lys Gly Asp Arg Gln Gly Ser Lys Ile Arg Thr Asn
          35          40          45
Ile Val Thr Leu Gln Gln Lys Asp Glu Ser Thr Ala Thr Asp Met Arg
          50          55          60
Glu Leu Leu Lys Glu Glu Pro Ser Ile Asp Phe Gly Gly Gly Asn Gly
65          70          75          80
Thr Ser Gln Phe Leu Thr Leu Arg Gly Met Gly Gln Asn Ser Val Asp
          85          90          95
Ile Lys Val Asp Asn Ala Tyr Ser Asp Ser Gln Ile Leu Tyr His Gln
          100          105          110
Gly Arg Phe Ile Val Asp Pro Ala Leu Val Lys Val Val Ser Val Gln
          115          120          125
Lys Gly Ala Gly Ser Ala Ser Ala Gly Ile Gly Ala Thr Asn Gly Ala
          130          135          140
Ile Ile Ala Lys Thr Val Asp Ala Gln Asp Leu Leu Lys Gly Leu Asp
145          150          155          160
Lys Asn Trp Gly Val Arg Leu Asn Ser Gly Phe Ala Ser Asn Glu Gly
          165          170          175
Val Ser Tyr Gly Ala Ser Val Phe Gly Lys Glu Gly Asn Phe Asp Gly
          180          185          190
Leu Phe Ser Tyr Asn Arg Asn Asp Glu Lys Asp Tyr Glu Ala Gly Lys
          195          200          205
Gly Phe Arg Asn Val Asn Gly Gly Lys Thr Val Pro Tyr Ser Ala Leu
          210          215          220
Asp Lys Arg Ser Tyr Leu Ala Lys Ile Gly Thr Thr Phe Gly Asp Asp
225          230          235          240
Asp His Arg Ile Val Leu Ser His Met Lys Asp Gln His Arg Gly Ile
          245          250          255
Arg Thr Val Arg Glu Glu Phe Thr Val Gly Asp Lys Ser Ser Arg Ile
          260          265          270
Asn Ile Asp Arg Gln Ala Pro Ala Tyr Arg Glu Thr Thr Gln Ser Asn
          275          280          285
Thr Asn Leu Ala Tyr Thr Gly Lys Asn Leu Gly Phe Val Glu Lys Leu
          290          295          300
Asp Ala Asn Ala Tyr Val Leu Glu Lys Glu Arg Tyr Ser Ala Asp Asp
305          310          315          320
Ser Gly Thr Gly Tyr Ala Gly Asn Val Lys Gly Pro Asn His Thr Arg
          325          330          335
Ile Thr Thr Arg Gly Ala Asn Phe Asn Phe Asp Ser Arg Leu Ala Glu
          340          345          350
Gln Thr Leu Leu Lys Tyr Gly Ile Asn Tyr Arg His Gln Glu Ile Lys
          355          360          365
Pro Gln Ala Phe Leu Asn Ser Lys Phe Ser Ile Pro Thr Thr Glu Glu
          370          375          380
Lys Asn Gly Gln Lys Val Asp Lys Pro Met Glu Gln Gln Met Lys Asp
385          390          395          400
Arg Ala Asp Glu Asp Thr Val His Ala Tyr Lys Leu Ser Asn Pro Thr
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Lys Thr Asp Thr Gly Val Tyr Val Glu Ala Ile His Asp Ile Gly Asp
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Phe Thr Leu Thr Gly Gly Leu Arg Tyr Asp Arg Phe Lys Val Lys Thr
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Ser Glu Lys Ser Tyr Gln Glu Val Leu Lys Ile Arg Gln Glu Ser Tyr
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Trp Lys Arg Met Lys Ser Phe Ser Leu Phe Glu Val Ile Met His Trp
35 40 45
Thr Ala Ser Leu Asn Lys His Thr Cys Arg Ser Tyr Arg Gly Ser Phe
50 55 60
Leu Ser Leu Glu Lys Ile Gly Leu Leu Ser Leu Asp Met Asn Leu Gln
65 70 75 80
Glu Phe Ser Leu Leu Asn His Asn Leu Ile Leu Asp Ala Ile Lys Lys
85 90 95
Val Ser Ser Ala Lys Thr Ser Trp Thr Glu Gly Thr Lys Gln Val Arg
100 105 110
Ala Ala Ser Tyr Ile Ser Leu Thr Arg Phe Leu Asn Arg Met Thr Gln
115 120 125
Gly Ile Val Ala Ile Ala Gln Pro Ser Lys Gln Glu Asn Ser Arg Thr
130 135 140
Phe Phe Lys Thr Arg Glu Ile Val Lys Thr Asp Ala Met Asn Ser Leu
145 150 155 160
Gln Thr Ala Ser Phe Leu Lys Glu Leu Lys Lys Ile Asn Ala Arg Asp
165 170 175
Trp Leu Ile Ala Gln Thr Met Leu Gln Gly Gly Lys Arg Ser Ser Glu
180 185 190
Val Leu Ser Leu Glu Ile Ser Gln Ile Cys Phe Gln Gln Ala Thr Ile
195 200 205
Ser Phe Ser Gln Leu Lys Asn Arg Gln Thr Glu Lys Arg Ile Ile Ile
210 215 220
Thr Tyr Pro Gln Lys Phe Met His Phe Leu Gln Glu Tyr Ile Gly Gln
225 230 235 240
Arg Arg Gly Phe Val Phe Val Thr Arg Ser Gly Lys Met Val Gly Leu
245 250 255
Arg Gln Ile Ala Arg Thr Phe Ser Gln Ala Gly Leu Gln Ala Ala Ile
260 265 270
Pro Phe Lys Ile Thr Pro His Val Leu Arg Ala Thr Ala Val Thr Glu
275 280 285
Tyr Lys Arg Leu Gly Cys Ser Asp Ser Asp Ile Met Lys Val Thr Gly
290 295 300
His Ala Thr Ala Lys Met Ile Phe Ala Tyr Asp Lys Ser Ser Arg Glu
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Asp Asn Ala Ser Lys Lys Met Ala Leu Ile
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<210> 6

<211> 6048

<212> DNA

<213> Neisseria gonorrhoeae

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gcacctaaaa accagcaggt cgttatcctt aaaaccaaca ctggtgcccc cttggtgaat	300
atccaaactc cgaatggacg cggattgagc cacaaccgct atacgcagtt tgatgttgac	360
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gacggtgcac	tgacaggatt	tgatgtgcgt	caaggcacat	tgaccgtagg	agcagcaggt	660
tggaatgata	aaggcggagc	cgactacacc	gggggtacttg	ctcgtgcagt	tgctttgcag	720
gggaaattac	agggtaaaaa	cctggcggtt	tctaccgggtc	ctcagaaaagt	agattacgcc	780
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gccgcactgg	gcggtatgta	cgccgacagc	atcacactga	ttgccaatga	aaaaggcgta	900
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<211> 2295

<212> DNA

<213> *Neisseria gonorrhoeae*

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<211> 2307

<212> DNA

<213> *Neisseria gonorrhoeae*

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<211> 1578

<212> DNA

<213> Neisseria gonorrhoeae

<400> 9

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<211> 993

<212> DNA

<213> Neisseria gonorrhoeae

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<210> 11

<211> 199

<212> PRT

<213> Mus musculus

<400> 11

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145					150				155					160	
Ala	Ser	Lys	Pro	Ala	Gly	Glu	His	Val	Phe	Gln	Val	Asp	Asn	Phe	Glu
				165				170					175		
Ala	Leu	Asn	Thr	Ile	Gln	Asn	Gln	Leu	Gln	Glu	Lys	Ile	Phe	Ala	Ile
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<210> 12

<211> 597

<212> DNA

<213> Mus musculus

<400> 12

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<210> 13

<211> 1561

<212> DNA

<213> Neisseria gonorrhoeae 1291

<400> 13

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<210> 14

<211> 525

<212> PRT

<213> Neisseria gonorrhoeae 1291

<400> 14

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		20						25				30			
Ser	Cys	Ser	Ser	Trp	Leu	Pro	Pro	Leu	Glu	Glu	Arg	Thr	Glu	Ser	Arg
		35					40				45				
His	Phe	Asn	Thr	Ser	Lys	Pro	Val	Leu	Leu	Asp	Asn	Ile	Leu	Gln	Ile
		50				55					60				
Arg	His	Thr	Pro	His	Asn	Asn	Gly	Leu	Ser	Asp	Ile	Tyr	Leu	Leu	Asp
65					70					75				80	
Asp	Pro	His	Glu	Ala	Leu	Ala	Ala	Arg	Ala	Ala	Leu	Ile	Glu	Ser	Ala
				85					90					95	
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<210> 16

<211> 525

<212> PRT

<213> Neisseria gonorrhoeae 1090

<400> 16

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			20					25					30		
Ser	Cys	Ser	Ser	Trp	Leu	Pro	Pro	Leu	Glu	Glu	Arg	Thr	Glu	Ser	Arg
			35				40					45			
His	Phe	Asn	Thr	Ser	Lys	Pro	Val	Leu	Leu	Asp	Asn	Ile	Leu	Gln	Ile
			50				55				60				
Arg	His	Thr	Pro	His	Asn	Asn	Gly	Leu	Ser	Asp	Ile	Tyr	Leu	Leu	Asp
65					70					75				80	
Asp	Pro	His	Glu	Ala	Phe	Ala	Ala	Arg	Ala	Ala	Leu	Ile	Glu	Ser	Ala
				85					90					95	
Glu	His	Ser	Leu	Asp	Leu	Gln	Tyr	Tyr	Ile	Trp	Arg	Asn	Asp	Ile	Ser
			100					105					110		
Gly	Arg	Leu	Leu	Phe	Asn	Leu	Met	Tyr	Leu	Ala	Ala	Glu	Arg	Gly	Val
			115				120					125			
Arg	Val	Arg	Leu	Leu	Leu	Asp	Asp	Asn	Asn	Thr	Arg	Gly	Leu	Asp	Asp
			130				135					140			
Leu	Leu	Leu	Ala	Leu	Asp	Ser	His	Pro	Asn	Ile	Glu	Val	Arg	Leu	Phe
145					150					155				160	
Asn	Pro	Phe	Val	Leu	Arg	Lys	Trp	Arg	Ala	Leu	Gly	Tyr	Leu	Thr	Asp


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<210> 18

<211> 525

<212> PRT

<213> Neisseria gonorrhoeae ms11

<400> 18

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Ser Cys Ser Ser Trp Leu Pro Pro Leu Glu Glu Arg Thr Glu Ser Arg
35          40          45
His Phe Asn Thr Ser Lys Pro Val Leu Leu Asp Asn Ile Leu Gln Ile
50          55          60
Arg His Thr Pro His Asn Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asp
65          70          75          80
Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala
85          90          95
Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser
100         105         110
Gly Arg Leu Leu Phe Asn Leu Met Tyr Leu Ala Ala Glu Arg Gly Val
115         120         125
Arg Val Arg Leu Leu Leu Asp Asn Asn Thr Arg Gly Leu Asp Asp
130         135         140
Leu Leu Leu Ala Leu Asp Ser His Pro Asn Ile Glu Val Arg Leu Phe
145         150         155         160
Asn Pro Phe Val Leu Arg Lys Trp Arg Ala Leu Gly Tyr Leu Thr Asp
165         170         175
Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp
180         185         190
Asn Arg Ala Thr Ile Leu Gly Gly Arg Asn Ile Gly Asp Glu Tyr Phe
195         200         205
Lys Val Gly Glu Asp Thr Val Phe Ala Asp Leu Asp Ile Leu Ala Thr

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210		215		220
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Ser His Ser Ala His	Asn Ala Thr Arg Ile Ile	Arg Ser Gly Asn Ile		
	245	250	255	
Gly Lys Gly Leu Gln	Ala Leu Gly Tyr Asn Asp	Glu Thr Ser Arg His		
	260	265	270	
Ala Leu Leu Arg Tyr	Arg Glu Thr Val Glu Gln	Ser Pro Phe Tyr Gln		
	275	280	285	
Lys Ile Gln Thr Gly	Arg Ile Asp Trp Gln Ser	Val Gln Thr Arg Leu		
	290	295	300	
Ile Ser Asp Ser Pro	Ala Lys Gly Leu Asp	Arg Arg Arg Lys Pro		
305	310	315	320	
Pro Ile Ala Gly Arg	Leu Gln Asp Ala Leu	Lys Gln Pro Glu Lys Ser		
	325	330	335	
Val Tyr Leu Val Ser	Pro Tyr Phe Val Pro	Thr Lys Ser Gly Thr Asp		
	340	345	350	
Ala Leu Ala Lys Leu	Val Gln Asp Gly Ile	Asp Val Thr Val Leu Thr		
	355	360	365	
Asn Ser Leu Gln Ala	Thr Asp Val Ala Ala	Val His Ser Gly Tyr Val		
	370	375	380	
Lys Tyr Arg Lys Pro	Leu Leu Lys Ala Gly	Ile Lys Leu Tyr Glu Leu		
385	390	395	400	
Gln Pro Asn His Ala	Val Pro Ala Thr Lys	Asp Lys Gly Leu Thr Gly		
	405	410	415	
Ser Ser Val Thr Ser	Leu His Ala Lys Thr	Phe Ile Val Asp Gly Lys		
	420	425	430	
Arg Ile Phe Ile Gly	Ser Phe Asn Leu Asp	Pro Arg Ser Ala Arg Leu		
	435	440	445	
Asn Thr Glu Met Gly	Val Val Ile Glu Ser	Pro Lys Ile Ala Glu Gln		
	450	455	460	
Met Glu Arg Thr Leu	Ala Asp Thr Thr Pro	Glu Tyr Ala Tyr Arg Val		
465	470	475	480	
Thr Leu Asp Lys His	Asn Arg Leu Gln Trp	His Asp Pro Ala Thr Arg		
	485	490	495	
Lys Thr Tyr Pro Asn	Glu Pro Glu Ala Lys	Leu Trp Lys Arg Ile Ala		
	500	505	510	
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<210> 19

<211> 1564

<212> DNA

<213> Neisseria meningitidis B

<220>

<221> misc_feature

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gcacacccct cataccaacg ggctatccga tatctatctg	ttgaacgacc cccacgaagc	240
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catctggcgc aacgacattt ccggccgact gctgttcaac	ctcgtgtacc ttgccgcaga	360
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<210> 20

<211> 525

<212> PRT

<213> Neisseria meningitidis B

<400> 20

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20          25          30
Ser Cys Ser Ser Trp Leu Pro Pro Leu Glu Glu Arg Thr Glu Ser Arg
35          40          45
His Phe Asn Thr Ser Lys Pro Val Arg Leu Asp Asn Ile Leu Gln Ile
50          55          60
Arg His Thr Pro His Thr Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asn
65          70          75          80
Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala
85          90          95
Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser
100         105         110
Gly Arg Leu Leu Phe Asn Leu Val Tyr Leu Ala Ala Glu Arg Gly Val
115         120         125
Arg Val Arg Leu Leu Leu Asp Asp Asn Asn Thr Arg Gly Leu Asp Asp
130         135         140
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145         150         155         160
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165         170         175
Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp
180         185         190
Asn Arg Ala Thr Ile Leu Gly Gly Arg Asn Ile Gly Asp Glu Tyr Phe
195         200         205
Lys Val Gly Glu Asp Thr Val Phe Ala Asp Leu Asp Ile Leu Ala Thr
210         215         220
Gly Ser Val Val Gly Glu Val Ser His Asp Phe Asp Arg Tyr Trp Ala
225         230         235         240
Ser His Ser Ala His Asn Ala Thr Arg Ile Ile Arg Ser Gly Asn Ile
245         250         255

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 290 295 300
 Ile Ser Asp Asp Pro Ala Lys Gly Leu Asp Arg Asp Arg Arg Lys Pro
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 Pro Ile Ala Gly Arg Leu Gln Asp Ala Leu Lys Gln Pro Glu Lys Ser
 325 330 335
 Val Tyr Leu Val Ser Pro Tyr Phe Val Pro Thr Lys Ser Gly Thr Asp
 340 345 350
 Ala Leu Ala Lys Leu Val Gln Asp Gly Ile Asp Val Thr Val Leu Thr
 355 360 365
 Asn Ser Leu Gln Ala Thr Asp Val Ala Ala Val His Ser Gly Tyr Val
 370 375 380
 Lys Tyr Arg Lys Pro Leu Leu Lys Ala Gly Ile Lys Leu Tyr Glu Leu
 385 390 395 400
 Gln Pro Asn His Ala Val Pro Ala Thr Lys Asp Lys Gly Leu Thr Gly
 405 410 415
 Ser Ser Val Thr Ser Leu His Ala Lys Thr Phe Ile Val Asp Gly Lys
 420 425 430
 Arg Ile Phe Ile Gly Ser Phe Asn Leu Asp Pro Arg Ser Ala Arg Leu
 435 440 445
 Asn Thr Glu Met Gly Val Val Ile Glu Ser Pro Lys Ile Ala Glu Gln
 450 455 460
 Met Glu Arg Thr Leu Ala Asp Thr Ser Pro Glu Tyr Ala Tyr Arg Val
 465 470 475 480
 Thr Leu Asp Arg His Asn Arg Leu Gln Trp His Asp Pro Ala Thr Arg
 485 490 495
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 500 505 510
 Ala Lys Ile Leu Ser Leu Leu Pro Ile Glu Ser Leu Leu
 515 520 525

<210> 21

<211> 15

<212> PRT

<213> Neisseria gonorrhoeae

<400> 21

Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp Asn Arg Ala Cys
 1 5 10 15

<210> 22

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic primer used in a PCR.

<400> 22

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32

<210> 23

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic primer used in a PCR.

<400> 23

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42

<210> 24

<211> 1561

<212> DNA

<213> Neisseria gonorrhoeae

<400> 24

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<211> 1563

<212> DNA

<213> Neisseria gonorrhoeae

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<211> 1561

<212> DNA

<213> *Neisseria gonorrhoeae*

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<210> 27

<211> 1561

<212> DNA

<213> *Neisseria gonorrhoeae*

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<212> DNA

<213> Artificial Sequence

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<400> 28

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<223> A synthetic primer used in a PCR.

<400> 29

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<223> A synthetic primer used in a PCR.

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